

# Effects of a Common Marine Algal Toxin on Early Development and Behavioral Performance in Fish

*Kathi A. Lefebvre, Vera L. Trainer and Nathaniel L. Scholz*

*NOAA Fisheries*

## **Abstract**

Algal toxins are detected extracellularly in both media of cultured toxic phytoplankton and in field-collected water samples obtained from bloom events. During harmful algal blooms, planktonic fish embryos and larvae are exposed to these dissolved toxins, yet little is known about their impacts on the developmental processes that establish the body plan and functional capacity of fish at early life history stages. Using zebrafish (*Danio rerio*) as a model system for fish development, morphological and behavioral effects of the dinoflagellate-produced neurotoxin, saxitoxin (STX), were examined. Additionally, the effects of STX on the visual system were investigated. Gross morphological aberrations (edema of the eyes, pericardium and yolk sac, and dorsal body curvature) and functional aberrations (delayed hatching, impaired optomotor function, reduced touch response, and complete paralysis) occurred at concentrations ranging from 112 to 350 ng STX equiv. ml<sup>-1</sup>. To confirm STX concentrations in exposure media, samples were taken regularly throughout each experiment and STX was quantified using a receptor-binding assay. A discussion of the ecological relevancy of toxic doses and the potential implications for population and community level impacts will be presented.